for the effect is not permanent unless the application is made for so long a time and so often as to run a risk of exciting a severe inflammation, with the possibility of causing greater disfigurement than the original hirsuties. Moreover, there are other more satisfactory means which are quite safe.

Radium is the latest addition to the therapeutic armamentarium. The romance of its discovery, the mystery of its radiations and emanation, its relation to some important scientific theories, and, above all, the possibility of its being the long desired cure of cancer, have fixed upon M. and Madame Curie's discovery the attention of the world. The element in the form of a bromide, and other compounds more or less pure, is now under trial in various diseases. Rodent ulcers and some superficial cancers react to it with very similar results to those obtained by the X-rays. There is no doubt that it is an agent of great value, but further observations are necessary to estimate its position. It can certainly be applied to disease in regions which it is now impossible to reach by the X-rays, but that its field in the treatment of cancer is limited is obvious. Its effect is local, so far as present observation has shown, and the remarks made above upon the influence of the X-rays in cancer apply equally here. Radium has to be used with great care, for it is powerful for evil as well as for good. If too long applied it causes destruction of tissue, and such destruction may take months to heal.

It will be gathered that rapid strides have been made in this field, and it would appear that we are but on the threshold of further developments. The latest discovery, the mysterious *n*-rays which are said to be produced by nervous and muscular action, does not appear to possess therapeutic importance, and whether it is likely to be of value in diagnosis is at present purely problematical.

IMPERIAL METEOROLOGY.

SLOWLY, but still step by step, the science of meteorology progresses, and new visions are opened up which suggest bright prospects for future possibilities, but which also lay exposed the lost opportunities of the past. Like every other science, the modern methods of observation, for at any rate the chief meteorological elements, are nearly all that can be desired, but when it is required to revert to observations made more than thirty or forty years ago, how lamentably few are the records and how uncertain in many cases is their accuracy. Further, anyone who has had occasion to hunt up early series of observations of pressure, temperature, rainfall, &c., records will have been struck with the common occurrence of breaks extending here and there for one, two, three or more years. Nevertheless, it is little use crying over the past, but strenuous efforts should be made in the future to see that the needed observations should be secured.

The more the variations of weather are studied the more is the idea strongly impressed on the investigator that these variations from year to year are not mere matters of chance, but are produced by a cause originating outside the earth's atmosphere, and with little doubt from the sun, naturally the prime factor and father of all the important weather changes.

His daily apparent journey round the earth, caused by the latter's rotation, is the origin of all the diurnal changes familiar to meteorologists.

The earth's journey round the centre of our solar system is again the origin of all the other meteorological variations which pass through their phases in a year.

From year to year, however, these daily and yearly variations, although they preserve more or less their original variations as regards their lengths of period, change in amount sometimes to a very great degree, and cause one to speculate on the probable kind of weather for the following year.

The view that these changes from year to year are due to the direct or indirect action of the sun has a very great degree of probability in its favour, since we know that this highly heated body is in an active state as deduced by the numerous and varied solar phenomena that have been observed. Further, the periodicities deduced from long series of solar observations have added another link in the chain of evidence showing that the sun's heat must be constantly varying, a fact which it is necessary to prove before solar influence can be put forth as a possible source of the terrestrial changes.

It is the work of the now numerous magnificent meteorological institutions spread over the globe for each to gather into its own particular net the meteorological changes that are occurring in its own area, and by means of these facts to forecast what kind of weather may be expected either on the following day, week or month, or as far ahead as possible. Many of these institutions for several years found that their own areas were too limited in extent to give them the necessary data for the work in hand, and so entered into a mutual compact with neighbouring countries for the exchange of certain pieces of meteorological information.

The present stage of meteorological investigation has in the last few years indicated that even this mutual help of the neighbouring countries, each working for its own immediate ends, is not sufficient for a satisfactory solution of world meteorology.

Sir John Eliot, who recently retired from the Indian Meteorological Department, one of the, if not the, finest meteorological service that exists, gives his views on this subject, which should be read by all those interested in the welfare of meteorological science (*Broad Views*, March).

Dealing with the Indian area during the period 1892 to 1902, he points out how these eleven years were unique in the history of Indian meteorology, but this condition was unfortunately disastrous to India. Not only did that extensive country suffer more severely from droughts and famines than during any other similar period for a hundred years at least, but it was paralleled, "so far as we are aware, only by the seven years of famine in Egypt in Biblical history." More interesting still is it to find that the drought of 1895 to 1902 "was a more or less general meteorological feature of the whole area, including Abyssinia, East and South Africa, Persia, Baluchistan, Afghanistan, India, probably Tibet, and the greater part or whole of Australia." Such a statement will probably recall the attention of our readers to an article published in this Journal (vol. lxvii. p. 225), in which it was stated:—"Commencing with Indian pressures (as represented by Bombay), the area was gradually extended to Ceylon (Colombo), Java (Batavia), Mauritius, and finally to Australia (Perth, Adelaide and Sydney). The striking similarity between these curves shows that over the whole of this area, which includes both north and south latitudes, the same kind of variation is in action, and therefore the whole region is intimately connected meteorologically." Sir John Eliot's remarks thus indicate the truth of this result.

In the article from which the above quotation was taken it was shown that while one hemisphere of the earth, which included Europe, southern Asia, Africa, India, and Australia, was experiencing high atmospheric pressure on the average, the other hemisphere, which included North and South America and Siberia

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was experiencing a deficiency of pressure, and *vice versâ*.

This apparent see-saw of pressure between the two hemispheres, which has a period of about four years or a little less on the average, indicates the importance of being acquainted simultaneously with the pressure conditions on *both* sides of the earth.

There seems every reason, then, for the purpose of long-period forecasting, for meteorological institutions to extend their spheres of inquiry still further afield.

Such being the case, it is important, therefore, that in this connection the views of Sir John Eliot, included in the following quotation from *Broad Views*, should be widely known, for who is there better capable of judging what is required than one who has so ably and successfully directed the Indian Meteorological Department for so many years?

"The next development of weather study will almost certainly be in the direction of international or world meteorology, and its relation to the phenomena of sun-spots and terrestrial magnetism.

"Sir Norman Lockyer has, we believe, made a most valuable and fertile suggestion which might lead up to this development. It is that the English Meteorological Office should collect meteorological data from the whole Empire, and should have a special branch to deal with and discuss the larger problems which would arise from such an extension of its field of work.

"It may perhaps be objected that Great Britain is outside the tropics, and that its weather has no connection with that of either India or Australia. This, however, is a matter which has not been taken up by any meteorologist for investigation and definite conclusions. The facts of the past ten or twelve years are, to say the least, suggestive. Whilst the Colonies and Empire in the East were suffering from drought parts of England were experiencing year after year shortage of rain. When the drought in Australia and in East India was giving way in 1903, England had a plethora of rain, almost tropical in character, disastrous to the crops.

"World Empire entails world duties, and one of these appears at the present time to be the study of meteorology from the imperial, and not solely from the national or parochial standpoint."

LABORATORIES FOR BOTANICAL RESEARCH.

THE publicity given to the opening ceremonials of the new science laboratories at Cambridge by the King and Queen on March 1 will, it may be hoped, do something to rouse those who are responsible for the welfare of the nation to a wider sense of their duties. The time has surely passed when the remarks of a well-known prelate and of a Prime Minister to the effect that they were born in a pre-scientific era could be received, if not with overt applause, at least with sneaking sympathy.

Sluggish as we are, some progress has been made. Up to the middle of the last century, and for some time after, there was scarcely a botanical laboratory properly so-called in the whole country. Now we have the Jodrell laboratory at Kew, a very modest institution when compared to the necessities of the case or to the excellent equipment of other departments of this great national establishment. The Jodrell laboratory is not intended for instructional purposes, but chiefly for study and research, and much good work has been done there.

At Cambridge, Edinburgh, Glasgow, Dublin, at University College, London, the Royal College of Science, and in many other universities, agricultural colleges and technical institutes, there are now more or less well equipped laboratories under competent direction. But these are mainly for the instruction of students. Research laboratories are still rare, and those willing and competent to utilise them are also few in number. This condition of affairs is largely due to the indifference and lack of encouragement on the part of those who ought to know better. The *cui bono* question is ever in their minds, and much too frequently on their lips. Abstract science does not appeal to their sympathies, or to their intelligence, unless some immediate practical result at once comes into view. When that happens, the commercial instinct may perchance be aroused, and they begin to ask, will it pay? Of course, no reader of this Journal is likely to undervalue abstract science, and most of them are well aware of the enormous value of the practical results that may and do result from it. But even such persons must have been startled to find how the observations of Bower and others on the minute anatomy of the prothallus and spore-producing tissues of ferns, observations which might have been thought to be too abstruse and recondite to be of any practical value whatever, have directly led up to the extremely important researches of Farmer and his associates into the essential nature of cancer!

Satisfactory as this undoubtedly is, we have only to look across the Channel to see how puny—numerically and financially speaking—are our efforts to promote original research. Our cousins across the Atlantic, a practical people if ever there was one, are even more energetic. Does a "freeze" destroy or seriously injure the oranges of Florida, what matter? In a very short time a man of science and a man of resource is on the spot. He looks for and finds a hardy stock whereon to graft the tender scion, he puts the resources of hybridisation to the test in the endeavour to procure hardy seedlings. All this is done at once by State or Government agency. Here, if anything were tried in a parallel case, it would be with great deliberation and with little or no encouragement or support.

Those familiar with what is done to promote research in the universities and colleges of the United States, as at New York, Chicago, Philadelphia, and in California, not to mention the older foundations of Harvard and Yale, must feel almost aghast at the progress that is being made, and at our own backwardness. In the *Gardeners' Chronicle* for January 30 is an article contributed by a well-known professor familiar with what is being done here as well as there. In that article he gives details as to the astonishing activity manifested in the American universities, mainly by the aid of funds provided by private individuals. We too have reason to know and appreciate what is done by the Government Agricultural Department, and by the very numerous experimental stations scattered all over the wide territories of the United States.

As we write, there comes to us a report of the establishment, under the auspices of the Carnegie Institution, of a "Desert Botanical Laboratory, the purpose of such establishment being to study thoroughly the relation of plants to an arid climate and to substrata of unusual composition." A laboratory has accordingly been erected near Tucson, in Arizona, under the management of Dr. W. A. Cannon, of the New York Botanical Garden, who has been appointed resident investigator in charge of the laboratory. What may be described as a sort of preliminary report has been drawn up by Mr. Coville and Dr.

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